REMARKS

Claims 1, 3 – 6 and 8 - 21 are pending and under consideration. Claims 1, 6 and 11 are amended herein. No new matter is presented herein. The amendments to claims 1, 6 and 11 provide greater clarity to the claimed subject matter and do not raise new issues for consideration. Entry of the amendments under 37 CFR 1.116 and reconsideration of the outstanding claims are respectfully requested in view of the foregoing amendments and the following remarks.

Rejection of claims 1 – 4, 6 – 9 and 11 – 13 under 35 U.S.C. §103 over Okada et al. and Iwata et al.

At page 2 of the Office Action, claims 1 - 4 and 6 - 9 and 11 - 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okada et al. (U.S. Patent 6,045,944) in view of Iwata et al. (U.S. Patent 6,447,949 B2). The Examiner repeated the allegations made in the Office Action of March 14, 2006. In particular, the Examiner took the position that it would have been obvious to use a plug that is tapered and flush with the top of the battery cap plate of Okada et al., on the alleged grounds that Iwata et al. teaches forming a tight seal with little or no gap between the electrolyte injection hole and plug so that electrolyte does not leak from the hole. Further, the Examiner alleged at page 7 of the Office Action that forming a plug having first and second tapering portions instead of a plug with a first stepped portion and a second tapered portion would be an obvious matter of design choice. For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

Independent claim 1 is directed to a cap assembly including, among other features, a cap plate having an electrolyte injection hole that includes first and second tapering portions with different slopes, and a plug comprising a body and an extension extending from the body and which is plugged into the electrolyte injection hole by pressing, wherein the body has an upper rim that matches an upper edge at the first tapering portion of the electrolyte injection hole, and wherein the body of the plug contacts the first tapering portion tightly and the extension contacts the second tapering portion tightly when the plug is pressed into the electrolyte injection hole. Independent claim 1 is amended herein to clarify that the first tapering portion of the electrolyte injection hole is more tapered than the second tapering portion. Similar limitations are added to independent claims 6 and 11.

As discussed in Applicants' previous response, neither Okada et al. nor Iwata et al.,

singly or in combination, describe an electrolyte injection hole and plug having the features of the present claims.

The electrolyte injection hole including the first and second tapering portions having different slopes provides functional advantages that are not taught, suggested or recognized in the applied art. In particular, in the present claims, the greater degree of tapering in the first tapering portion allows for electrolyte that remains near the electron injection hole after injection to flow naturally into the battery, while the second tapering portion provides a less tapered slope to prevent the escape of electrolyte. Thus, the electrolyte injection hole minimizes the likelihood of an electrolyte remaining near the electrolyte hole or escaping from the electrolyte hole even before the plug is installed, and when the plug is installed, failure in welding that may occur due to electrolyte remaining near the injection hole is prevented. Therefore, the electrolyte injection hole according to the present claims, along with the corresponding plug, clearly provides a patentable distinction over Okada et al. and Iwata et al., singly or combined and is not an obvious matter of design choice as alleged by the Examiner. For example, in a structure according to Figure 7 of Iwata et al., electrolyte that was present at or near the electrolyte injection hole before the plug is installed would accumulate and be trapped at the stepped portion of the electrolyte injection hole, thereby interfering with the insertion and welding of the plug.

Therefore, Okada et al. and Iwata et al., taken together or singly, do not teach or suggest all of the features of claims 1, 3, 4, 6, 8 – 9 and 11 – 13 (claims 2 and 7 having been previously canceled). Therefore, the rejection should be withdrawn.

Rejection of claims 1 – 3, 5 – 8, 10 – 12 and 14 - 21 under 35 U.S.C. §103(a) over Okada et al. in view of Watari

At page 4 of the Office Action, claims 1 - 3, 5 - 8, 10 - 12 and 14 - 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okada et al. (U.S. Patent 6,045,944) in view of Watari (JP 2001-313022). The Examiner repeated the allegations made in the Office Action of March 14, 2006. In particular, the Examiner took the position that it would have been obvious to use a plug that is tapered and flush with the top of the battery cap plate of Okada et al., on the alleged grounds that Watari teaches forming a tight seal with little or no gap between the electrolyte injection hole and plug so that electrolyte does not leak from the hole as well as

providing a plug made from a polymer of a nonaqueous electrolyte proof material that doesn't react with the electrolyte. Further, the Examiner alleged at page 7 of the Office Action that forming a plug having first and second tapering portions instead of a plug with first stepped portion and a second tapered portion would be an obvious matter of design choice. The Examiner further alleged that a plug coated with a polymer would have the same function as a plug constructed from a polymer. For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

As previously discussed, independent claim 1 is directed to a cap assembly including, among other features, a cap plate having an electrolyte injection hole that includes first and second tapering portions with different slopes, wherein the first tapering portion of the electrolyte injection hole is more tapered than the second tapering portion, and a plug comprising a body and an extension extending from the body and which is plugged into the electrolyte injection hole by pressing, wherein the body has an upper rim that matches an upper edge at the first tapering portion of the electrolyte injection hole, and wherein the body of the plug contacts the first tapering portion tightly and the extension contacts the second tapering portion tightly when the plug is pressed into the electrolyte injection hole. Similar limitations are contained in independent claims 6 and 11.

As discussed in Applicants' previous response, neither Okada et al. nor Watari, singly or in combination, describe an electrolyte injection hole and plug having the features of the present claims.

The electrolyte injection hole including the first and second tapering portions having different slopes provides functional advantages that are not taught, suggested or recognized in the applied art. In particular, in the present claims, the greater degree of tapering in the first tapering portion allows for electrolyte that remains near the electron injection hole after injection to flow naturally into the battery, while the second tapering portion provides a less tapered slope to prevent the escape of electrolyte. Thus, the electrolyte injection hole minimizes the likelihood of an electrolyte remaining near the electrolyte hole or escaping from the electrolyte hole even before the plug is installed, and when the plug is installed, failure in welding that may occur due to electrolyte remaining near the injection hole is prevented. Therefore, the electrolyte injection hole according to the present claims, along with the corresponding plug, clearly provides a patentable distinction over Okada et al. and Watari singly or combined and is not an obvious matter of design choice as alleged by the Examiner. For example, in a structure according to

Drawing 3 of Watari, electrolyte that was present at or near the electrolyte injection hole before the plug is installed would accumulate and be trapped at the circle-like crevice of the electrolyte injection hole, thereby interfering with the insertion and welding of the plug.

Therefore, Okada et al. and Watari, taken together or singly, do not teach or suggest all of the features of claims 1, 3 and 5 – 6, 8 - 9 and 10 – 12 and 14 – 21 (claims 2 and 7 having been canceled). Therefore, the rejection should be withdrawn.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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